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The international sugar market is not a "free" market because of extensive use of production quotas, import controls, government support prices, and preferential trade agreements of rich countries. In the United States, the European Union, and Japan, protectionist policies have resulted in domestic prices up to three times greater than the world sugar price. In recent years, the World Trade Organization (WTO), North American Free Trade Agreement (NAFTA), and regional agreements have mounted international pressure to liberalize sugar markets in the most offending countries but without much success. Nevertheless, the major protectionist countries are becoming aware that current sugar policies cannot last indefinitely.

The European Union is currently working toward a more liberal sugar policy, which is scheduled to be released later this year. With regional trade agreements either concluded or on the horizon, the United States will also have to address the issue of sugar reform. Sweetener trade has been a controversial part of NAFTA. Mexican sugar exports to the United States face trade impediments currently under investigation by a NAFTA panel; in retaliation, Mexico has put up discriminatory barriers to U.S. high fructose corn syrup (HFCS) exports, an action the WTO is currently investigating. The current sweetener disputes between the United States and Mexico illustrate the sad state of affairs in sweeteners markets in several member countries of the Organization for Economic Cooperation and Development (OECD); but they also stimulate our interest in knowing what sugar markets would look like if they were completely unfettered.

Modeling Sugar Reforms: Effects on Prices, Production, and Trade

CARD economists recently analyzed the impact of the removal of current market interventions in world sugar markets. The main scenario considered removes all trade distortions

Table 1. Impacts of full market liberalization on sugar price and net exports*

	01/02	06/07	11/12	Average
	(Thousand Metric Tons)			
Brazil				
Baseline	9,500	11,351	11,521	11,311.48
WTO	9,500	16,686	16,442	15,952.01
Change	0.0	5,335.0	4,920.7	4,640.53
% chg	0.00%	47.00%	42.71%	40.90%
European Union				
Baseline	1,850	3,555	4,634	3,734.87
WTO	1,850	-9,162	-7,594	-8,251.26
Change	0.0	-12,718	-12,228	-11,986
% chg	0.00%	-358%	-264%	-324%
Mexico				
Baseline	530	1,076	1,812	1,218.33
WTO	530	380	1,238	681.85
Change	0.0	-696.8	-573.1	-536.48
% chg	0.00%	-64.73%	-31.64%	-43.40%
China				
Baseline	-1,177	-1,219	-2,155	-1,450.67
WTO	-1,177	1,273	-684	899.12
Change	0.0	2,492.5	1,470.1	2,349.79
% chg	0.00%	-204.44%	-68.23%	-177.34%
Japan				
Baseline	-1,548	-1,524	-1,535	-1,531.41
WTO	-1,548	-1,927	-2,145	-1,922.46
Change	0.0	-403.0	-610.4	-391.05
% chg	0.00%	26.45%	39.77%	25.57%
United States				
Baseline	-1,344	-2,397	-3,132	-2,423.20
WTO	-1,344	-3,085	-3,463	-2,974.49
Change	0.0	-687.4	-330.9	-551.29
% chg	0.00%	28.67%	10.57%	24.00%
SUGAR PRICES				
FOB Caribbean Price	(U.S. Dollars per Metric Ton)			
Baseline	190	215	239	214.61
WTO	190	344	351	351.36
Change	0.0	129.9	112.0	136.74
% chg	0.00%	60.50%	46.89%	64.96%
New York Spot				
Baseline	465	409	394	415.78
WTO	465	367	373	373.40
Change	0.0	-42.1	-21.5	42.38
% chg	0.00%	-10.30%	-5.46%	-10.12%

*Note: A negative net export value means the country is a net importer.

(tariffs, export taxes/subsidies, tariff rate quotas, and state trading) and all domestic support to producers and taxes on consumers. In our model, we implement the reforms in the 2002/03 trade year and measure their resulting deviations from the baseline through 2011/12.

Under the full removal of all trade and domestic production and consumption distortions, major changes occur (see Tables 1 and 2). Prices increase by 47 percent by the end of the projection period. Aggregate trade expands moderately, but the location of production and trade patterns are substantially affected. Protectionist OECD countries (the European Union, Japan, and, to a lesser extent, Mexico and the United States) experience an import expansion or export reduction and significant contraction in production.

World sugar beet production decreases by 21 percent by the end of the decade, whereas world sugarcane production increases by 7 percent. Hence, as conventional wisdom suggests, cane sugar production tends to be more competitive than beet sugar production. The full set of country-specific results is available at www.card.iastate.edu in the paper ("Multilateral Trade and Agricultural Policy Reforms in Sugar Markets"). These full results show that Brazil, Australia, Cuba, Indonesia, Malaysia, and Turkey significantly expand sugar production when all distortions are removed. Aggregate world sugar production

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Table 2. Impacts of full market liberalization on sugar production and consumption

	01/02	06/07	11/12	Average
	(Thousand Metric Tons)			
United States				
Production				
Baseline	7,189	7,942	7,983	7965.40
WTO	7,189	7,264	7,585	7454.10
Change	0.0	-678.2	-398.4	-511.29
% chg	0.00%	-8.54%	-4.99%	-6.42%
Consumption				
Baseline	9,335	10,203	10,976	10258.58
WTO	9,335	10,254	10,995	10309.33
Change	0.0	50.9	19.7	50.75
% chg	0.00%	0.50%	0.18%	0.50%
European Union				
Production				
Baseline	16,178	18,522	19,752	18702.35
WTO	16,178	6,309	7,956	7202.49
Change	0.0	-12,213	-11,797	-11,500
% chg	0.00%	-65.94%	-59.72%	-61.43%
Consumption				
Baseline	14,700	14,921	15,088	14932.70
WTO	14,700	15,413	15,527	15390.47
Change	0.0	491.4	439.3	457.76
% chg	0.00%	3.29%	2.91%	3.06%
Brazil				
Production				
Baseline	18,500	21,893	22,729	21871.81
WTO	18,500	26,369	26,713	25582.09
Change	0.0	4,475.1	3,984.5	3710.28
% chg	0.00%	20.44%	17.53%	16.85%
Consumption				
Baseline	9,450	10,549	11,211	10565.25
WTO	9,450	9,673	10,265	9657.02
Change	0.0	-876.3	-946.1	-908.23
% chg	0.00%	-8.31%	-8.44%	-8.61%
Japan				
Production				
Baseline	795	852	898	854.26
WTO	795	506	321	514.23
Change	0.0	-346.1	-576.9	-340.03
% chg	0.00%	-40.63%	-64.25%	-39.06%
Consumption				
Baseline	2,350	2,376	2,433	2383.36
WTO	2,350	2,432	2,467	2433.79
Change	0.0	56.9	34.3	50.43
% chg	0.00%	2.40%	1.41%	2.12%
China				
Production				
Baseline	7,623	8,359	8,980	8375.08
WTO	7,623	9,704	9,737	9437.40
Change	0.0	1,344.9	756.9	1062.32
% chg	0.00%	16.09%	8.43%	12.72%
Consumption				
Baseline	8,800	9,582	11,149	9834.95
WTO	8,800	8,397	10,418	8563.96
Change	0.0	-1,184.3	-731.0	-1270.98
% chg	0.00%	-12.36%	-6.56%	-13.31%
Mexico				
Production				
Baseline	5,092	5,817	6,850	6005.68
WTO	5,092	5,180	6,345	5528.99
Change	0.0	-636.8	-504.9	-476.68
% chg	0.00%	-10.95%	-7.37%	-7.79%
Consumption				
Baseline	4,543	4,747	5,047	4793.55
WTO	4,543	4,805	5,116	4850.27
Change	0.0	58.2	68.5	56.71
% chg	0.00%	1.23%	1.36%	1.18%

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and use decrease by 3 percent. The world price increases dramatically, to 47 percent above the baseline level in 2011/12. Production declines significantly in the most protected OECD markets (dropping, on average, 61 percent for the European Union, and 39 percent for Japan). The declines are smaller for Mexico (8 percent) and the United States (6 percent). Production increases in competitive countries (Brazil, 17 percent; Cuba, 16 percent; Australia, 10 percent). This result is caused by the high world price resulting from the removal of trade and domestic distortions that affect sugar production. The net incentive effect is positive for producers (a world price increase net of tariff and subsidy removal).

Reform Effects on Consumption

The changes in consumption are also pronounced. Countries with moderate border protection experience higher consumer prices. For example, in China, consumption, on average, decreases by 13 percent. In countries with high tariffs, the benefits from policy reforms accruing to domestic consumers are mitigated by the stronger world price increases. However, since sugar demand tends to be inelastic (that is, insensitive) to price, these changes are not dramatic. Sugar consumption increases by 3 percent in the European Union and by 2 percent in Japan. U.S. consumption of sugar increases by less than 1 percent.

Consumption distortions exist in a few countries (Egypt, Cuba, and Morocco) and their removal has a negligible impact on world market prices. In Egypt, consumption decreases by 21 percent. In Cuba, because of the large subsidy removal, consumption decreases significantly, by an average of 42.5 percent between 2002/03 and 2011/12. Finally, in Morocco, the removal of the consumption subsidy results in the reduction of sugar consumption by 11 percent relative to the baseline.

Despite the stalled WTO agricultural negotiations in the Doha Round, the U.S. sugar industry is keen on promoting a multilateral approach to sugar policy reform and has vehemently opposed the bilateral negotiations of the current U.S. administration. The multilateral negotiation argument has been a convenient veil of legitimacy for U.S. protectionist interests. For example, the sugar industry fought the U.S.-Australia Free Trade Agreement (FTA) on that basis. Nevertheless, the numbers presented here provide some credence to the U.S. sugar industry's claim about creating a "world dump price." It appears that the competitive segment of the U.S. sugar industry would survive in unfettered markets. A major qualifier is that the analysis understates exit/entry and investment decisions in sugar production. The predicted drastic increases in the world price may induce massive investment in sugar production and reduce these price changes considerably.

Winners and Losers in Unfettered Markets

Despite these limitations, it is clear that removing all policies would cause a massive production relocation away from protected OECD markets (the European Union, Japan, and, to a lesser extent, Mexico and the United States) and toward producers in competitive countries, chiefly Brazil, Cuba, and Australia. Hence, there is a large contingent of foreign sugar interests demanding open U.S. borders. Producers in the European Union and Japan would be the biggest losers under unfettered markets. The large increase in price is little solace for their sugar producers, who would probably be wiped out. European Union producers might want to focus on quickly negotiating a buyout program within the ongoing Common Agricultural Policy reforms, while the Doha Round evolves slowly and the Everything But Arms agreement is not yet fully implemented. Japanese sugar producers may well be the last bastion of protectionism in global sugar markets.

In contrast, sugar interests in Mexico and the United States would lose in unfettered markets (free trade and no domestic subsidies), but they would survive the global policy reform. Although at odds within NAFTA, the two countries have a common goal in resisting global sugar policy reform. This is ironic since they are implicated in the undoing of their own protections because of their NAFTA and Uruguay Round commitments. The analysis also makes clear that trade liberalization without domestic reforms would induce import surges in the United States. These surges would make domestic programs unsustainable because of current policy commitments. A similar pattern emerges in the European Union, which would be constrained in its ability to export expensive domestic sugar displaced by cheaper imports. Of course, one should never underestimate the strength of the sugar lobby in OECD countries. The imminent unraveling of sugar protectionism has been predicted before, as shown in the recent outcome of the U.S.-Australia FTA, which took sugar off the negotiating table. ◆